



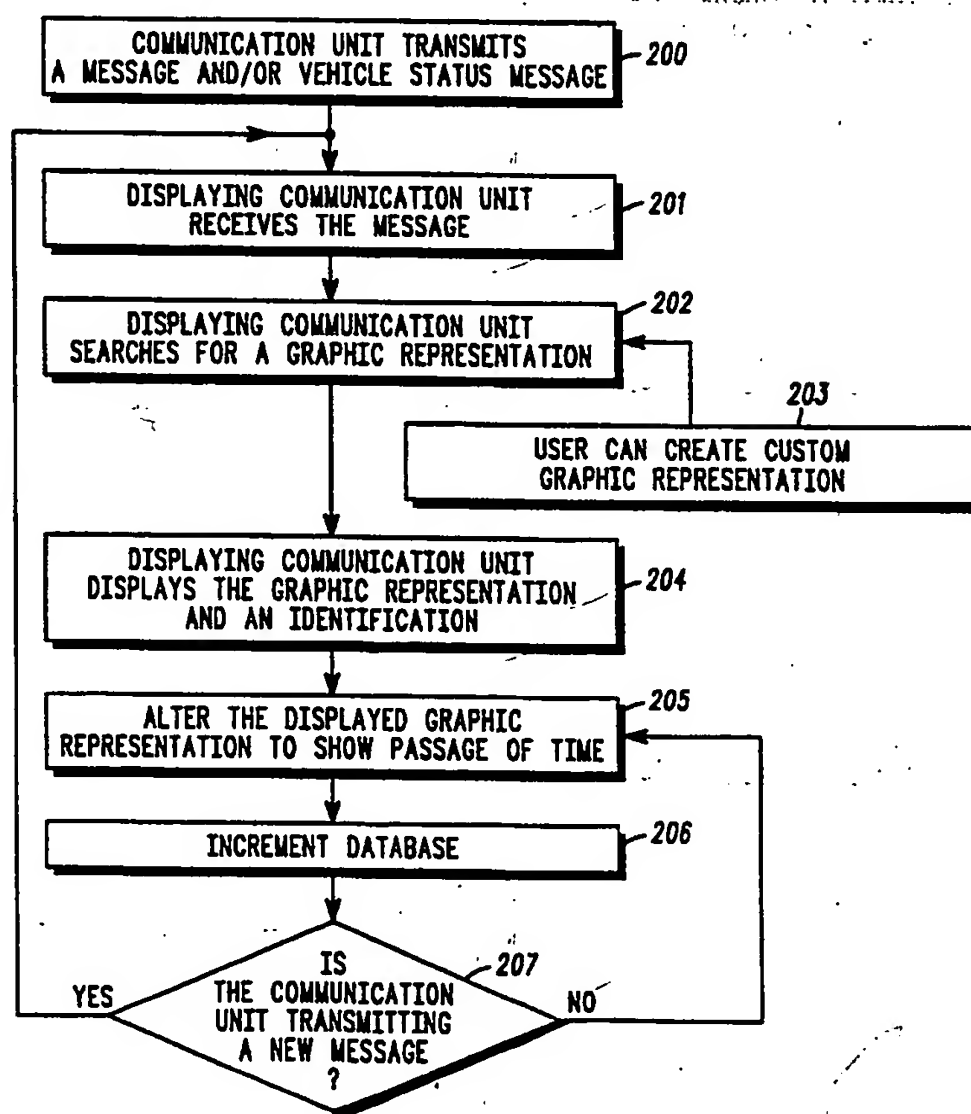
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/US90/04683 (22) International Filing Date: 20 August 1990 (20.08.90) (30) Priority data: 399,798 29 August 1989 (29.08.89) US (71) Applicant: MOTOROLA, INC. [US/US]; 1303 East Algonquin Road, Schaumburg, IL 60196 (US). (72) Inventors: REED, John, Douglas ; 5610 Shady Hill Lane, Arlington, TX 76016 (US). ROZANSKI, Walter, J. ; 408 Heather Lane, Hurst, TX 76054 (US). (74) Agents: PARMELEE, Steven, G. et al.; Motorola, Inc., Intellectual Property Dept., 1303 East Algonquin Road, Schaumburg, IL 60196 (US).		(81) Designated States: AT (European patent), BE (European patent), CH (European patent), DE (European patent)*, DK (European patent), ES (European patent), FR (European patent), GB (European patent), IT (European patent), JP, LU (European patent), NL (European patent), SE (European patent). Published <i>With international search report.</i>

(54) Title: GRAPHIC MESSAGE INTERPRETER FOR COMMUNICATION SYSTEMS

(57) Abstract

A communication unit of a communication system that is equipped with a display and a graphic storage device such that when the communication unit receives messages from other communication units (201) it can graphically interpret the message. The graphic representation of the message (204) allows an operator of such a communication unit to quickly identify the transmitting communication unit, the message, and other information regarding the transmitting communication unit.



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10 GRAPHIC MESSAGE INTERPRETER FOR COMMUNICATION SYSTEMSTECHNICAL FIELD

15 The present invention relates generally to communication systems and in particular to such systems that transmit messages among a plurality of communication units wherein at least one of the communication units can graphically display a received message.

BACKGROUND OF THE INVENTION

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It is well known that within a communication system, communication units readily transmit and receive messages. In many communication systems, a transmitting communication unit can select a message from a predetermined set of messages and transmit it to a selected receiving communication unit. The receiving communication unit is generally a dispatch console or mobile unit equipped with a data terminal. The messages could range from the transmitting communication unit's position, destination, or time in route to indicating that it is lunch time.

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The information transmitted in a message typically indicates which communication unit is transmitting the message, its present mode of operation and several other statistics of the transmitting communicating unit. Typically, several lines of text are required to display all of this information. In large communication systems, a dispatch console may be monitoring dozens, or even hundreds, of transmitting communication units at one time. With the messages being displayed in text form, the operator of the dispatch console may have a difficult time reading all of the information required to properly monitor the transmitting communication units.

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Therefore a need exists for a method and apparatus which allows an operator of a communication unit to readily monitor transmitted messages.

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SUMMARY OF THE INVENTION

This need and others are substantially met by the graphic message interpreter for communication systems discussed herein. In a communication system wherein at least one of the communication units has a displaying device where the displaying device displays graphic representations of messages. The communication unit displays the messages by receiving a message and displaying a graphic representation of that message.

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In one embodiment, the displaying communication unit displays a plurality of messages from a variety of communication units. The displaying communication unit also alters graphic display of the message at predetermined intervals to show a passage of time.

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BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 illustrates a communication system which performs in accordance with the disclosed invention.

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Figure 2 illustrates a flow chart of how a communication unit may implement the disclosed invention in a communication system of figure 1.

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Figure 3 illustrates a dispatch console which implements the disclosed invention and operates in a communication system of figure 1.

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BEST MODE FOR CARRYING OUT THE INVENTION

Figure 1 illustrates a communication system (100) comprising a plurality of communication units (101) (shown are n number of communication units) and a displaying communication unit (102). A communication unit (101 & 102) is any device which transmits and/or receives RF signals. The displaying communication unit (102) comprises a graphic storage element (103), a microprocessor (104), transmit/receive circuitry (105), and a display (106). The transmit/receive circuitry (105) may be any conventional two-way communication topology which transmits and receives RF signals. The display (106) may be any device which allows information to be displayed such as a computer terminal, LCD screen, or CRT screen. The graphic storage element (103) may be any storage device which will store the graphic representations of the messages such as a computer disc, RAM, or ROM device.

Generally, any communication unit (101 & 102) may transmit a message to any other communication unit (101 & 102). If the message is received by a displaying communication unit (102), the message is displayed graphically, or pictorially. Note that a graphic representation of a message is any picture, or symbol, which and is not an alphanumeric, however, as discussed below, a graphic representation and an alphanumeric code may be combined. The displaying communication unit (102), after receiving the message, checks the graphic storage element (102) to determine if a graphic representation of the message is stored. If the graphic representation is stored, the displaying communication unit (102) displays the graphic representation on the display (106) such that an operator of the displaying communication unit may readily interpret the message.

Figure 2 illustrates how the displaying communication unit (102) displays a graphic representation of a received message. To initiate the process, as shown in step (200), another communication unit (101) transmits a message, and/or a vehicle status message, to the displaying communication unit (102). A vehicle status message

is transmitted by a communication unit (101) that is installed in a vehicle having a vehicle monitoring device, where the vehicle monitoring device monitors the vehicle's functions. The vehicle monitoring device detects abnormal vehicle functions, such as low oil pressure, or that the engine is over heating, and, in association with the communication unit (101), transmits this to the displaying communication unit (102). The vehicle status message may also indicate general vehicle information such as when scheduled maintenance is to be performed, or the mileage traveled per activity.

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Once the displaying communication unit (102) receives the message (201), it checks the graphic storage element (103) for a graphic representation of the message (202). The graphic representations may be customized to meet a user's needs (203), and a variety of graphic representations will be discussed below. After finding the graphic representation in the graphic storage element (103), the displaying communication unit (102) displays it (204) on the display (106). The displaying communication unit (102) may also display, in an alpha-numeric form, an individual identification code of the communication unit (101) sending the message (204). The individual identification code may be the identification code of the communication unit (101) or an alias given by the operator of the displaying communication unit.

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Since the displaying communication unit (102) is equipped with a microprocessor (104) or similar device, the microprocessor (104) may be programmed to alter the display (205) to show a passage of time. The microprocessor (104) may also increment a database (206) such that for each message being displayed, a record is updated for each communication unit (101) which sent the message. The record may be used to generate a hard copy of the status of the communication units or may be displayed on the display (106). If a new message is transmitted by the same communication unit (101) being presently displayed (207), the display process will repeat at step 201, otherwise, the displaying communication unit (102) will continue to alter the display (205).

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Figure 3 illustrates a displaying communication unit (102) which may be a dispatch console, or a properly equipped mobile, or portable, communication unit. The dispatch console generally monitors several communication units (101) at any given time (shown are four (4) graphic representations (300 - 303)) however, many more, or even less, may be displayed, depending on the operator's preference. Also shown is a menu list (305), an alpha-numeric individual identification code (306), a keyboard (307), a cursor or selection device (308), and a graphic representation of a vehicle status message (309).

As discussed above, a displaying communication unit (102), in this example a dispatch console for a concrete company, receives a message from a communication unit (101) and graphically displays the message. The communication units (101) may select a message from a predetermined set of messages. The predetermined set of messages is generally defined by the user to suit his needs. For example, the communication unit may select and transmit a message which indicates that he is loading, in route, pouring, on break, returning to the company, or at lunch. Once the message is received by the dispatch console, a graphic representation of the message is displayed. Shown in figure 3 is a communication unit on break (300), a cement truck being loaded (301), a cement truck pouring (302), and a cement truck in route (303). By having an alpha-numeric alias assigned (306), the dispatch console operator can readily monitor the status of each communication unit, in this example, the drivers of several cement trucks. The dispatch operator may quickly check the display and see that Bob Jones who is driving truck number 100 is on break, Bill Smith who is driving truck number 330 is loading, Tom Davis who is driving truck number 35 is in route, and Steve Norton who is driving truck number 200 is pouring. The dispatch operator can also determine that truck, or unit, 035 is low on oil.

Since the dispatch console is equipped with a microprocessor (104) that is programmed to alter and record the status of each communication unit, the displayed messages may be changed to indicate a passage of time. For example, the color of the message

could change to show how long a message has been displayed. Thus, the graphic representation of Bob Jones, on break, could start out as blue to indicate that he just went on break and, as time passed, the color could change at predetermined intervals, such that after thirty minutes, or any predetermined period of time, it could change to red which may be interpreted as Bob Jones having been on break too long. The microprocessor (104) may also alter the graphic representations by having the color, or colors, of the graphic representations change, beginning at one edge and move across a graphic representation, to indicate a completion percentage of a task based on an allotted completion time for that task.

The present invention also allows the dispatch console operator to quickly and easily send messages to the communication units (101). For example, if the dispatch console operator wishes to send a message to Bill Smith, he may by using the keyboard (307), or the equivalent, select a transmit function from the menu (305) and point the cursor or selection device (308) at the graphic representation of Bill Smith's communication unit (301). Once the transmit function and the communication unit have been selected, the message is transmitted to the communication unit operated by Bill Smith. The dispatch console operator may also send an individual message, such as "You are delivering the cement to the wrong company" or "The order has been cancelled, return to base." This is readily accomplished by selecting a communication unit (101) with the selection device (308) and typing the message on the keyboard (307), or communicating it verbally, then sending it, via the transmit/receive circuitry (105), to the selected communication unit (101).

The present invention allows an operator of a displaying communication unit (102) to obtain message information at a glance, where an operator of a communication unit (101) not equipped with the disclosed invention would possibly have to read several lines of text to obtain the same information. Also, as may be inferred from the above discussion, there is almost an endless possibility of

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graphic representations depending on the user's needs and the quality of graphics desired.

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CLAIMS

What is claimed is:

- 5 1. In a communication system wherein at least one of a plurality of communication units has a displaying device, a method for graphically displaying messages comprising the steps of:

10 a) receiving at least one of the messages to form a received message; and

b) displaying a graphic representation of the received message to form a graphic display.

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2. The method of claim 1 wherein step (b) further comprises displaying an individual identification code of a communication unit transmitting the received message.

5 3. The method of claim 1 further comprising the step of altering the graphic display at predetermined intervals to indicate a passage of time.

10 4. The method of claim 3 further comprising updating a database at the predetermined intervals to record the passage of time for each communication unit which transmits one of the messages.

15 5. The method of claim 1 further comprises receiving a plurality of the messages.

20 6. The method of claim 5 further comprises displaying a graphic representation of each of the plurality of the messages.

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7. In a communication system having a plurality of communication units, wherein at least one of the communication units transmits at least one of a predetermined set of messages to at least one other communication unit, such that a communication unit which transmits
5 a message of the predetermined set of messages forms a transmitting communication unit and a communication unit which receives the transmitted message of the predetermined set of messages forms a receiving communication unit, at least one of the receiving communication units comprises:

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graphic storage means for storing a graphic representation of at least some of the message of the predetermined set of messages; and

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displaying means, operably associated with the graphic storage means, for displaying the graphic representation of a received message.

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8. The communication unit of claim 7 further comprises graphic altering means, operably associated with the display means, for altering the display of the graphic representation of the received message at predetermined intervals to indicate a passage of time.

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9. The communication unit of claim 8 further comprises recording means, operably associated with the graphic altering means, for recording the passage of time for each transmitting communication unit which transmits one of the predetermined set of messages.

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10. The communication unit of claim 7 wherein the displaying means further comprises displaying a plurality of the graphic representation of each message of the predetermined set of messages.

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11. The communication unit of claim 7 further comprises:

menu means, operably associated with the displaying means, for providing at least one transmitting function;

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selecting means, operably associated with the menu means and the display means, for selecting one of the graphic representation of each message of the predetermined set of messages to form a selected graphic, and for selecting the transmitting function to form a selected transmitting function; and

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transmitting means, operably associated with the selecting means and the menu means, for transmitting the selected transmitting function to the transmitting communication unit which sent the message represented by the selected graphic.

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12. In a communication system having a plurality of communication units, wherein at least one of the plurality of communication units is associated with a vehicle having a vehicle monitoring device to form a vehicle communication unit that transmits vehicle status messages, and at least one other of the plurality of communication units has a displaying device and a graphic storage device to form a displaying communication unit, a method for the displaying communication unit to graphically display messages and the vehicle status messages comprising the steps of:

a) receiving at least one of the vehicle status messages from the vehicle communication unit to form a received vehicle status message; and

b) displaying a graphic representation of the received vehicle status message.

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13. The method of claim 12 further comprising the steps of:

c) receiving at least one of the messages to form a received message; and

d) displaying a graphic representation of the received message.

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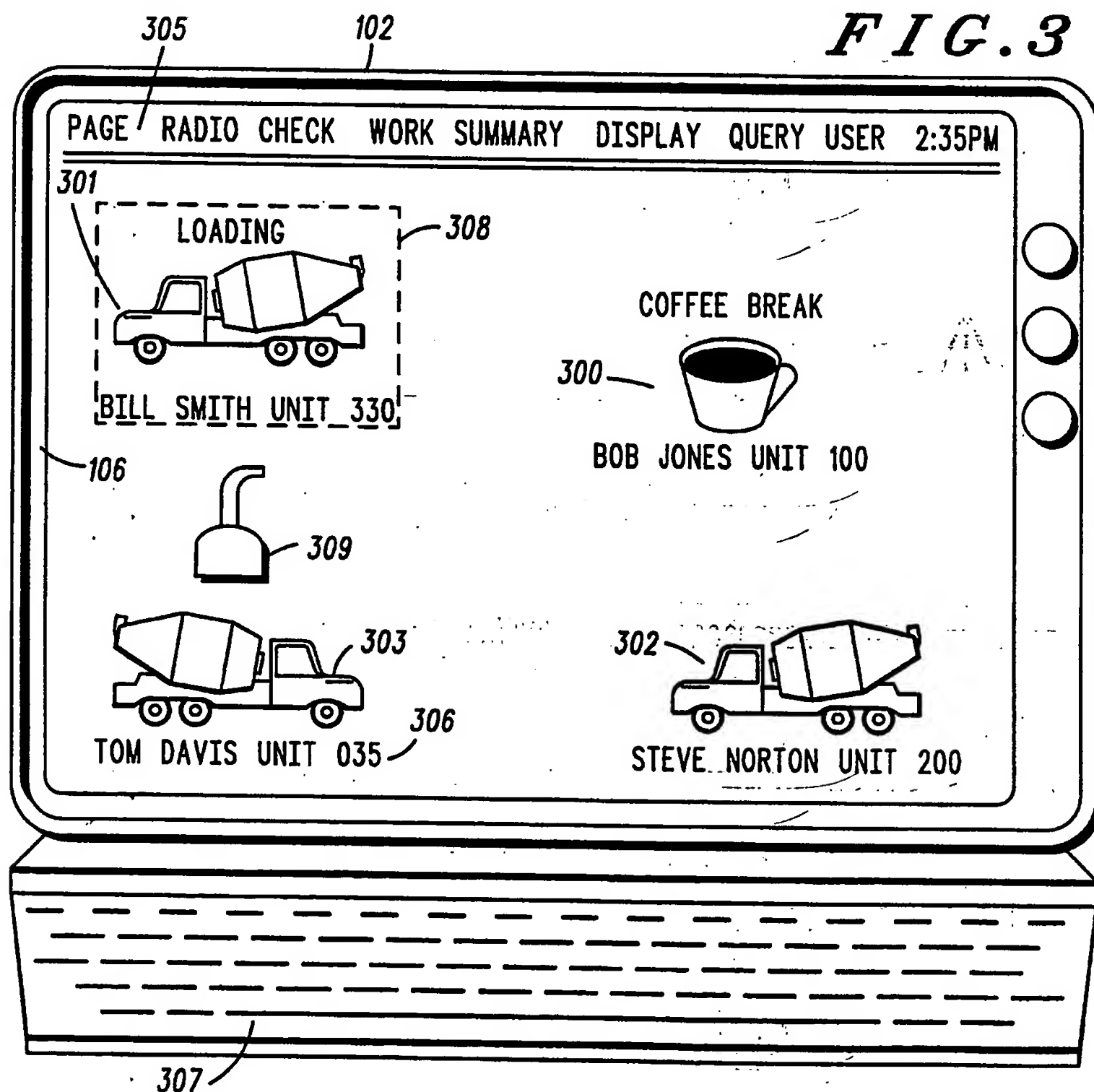
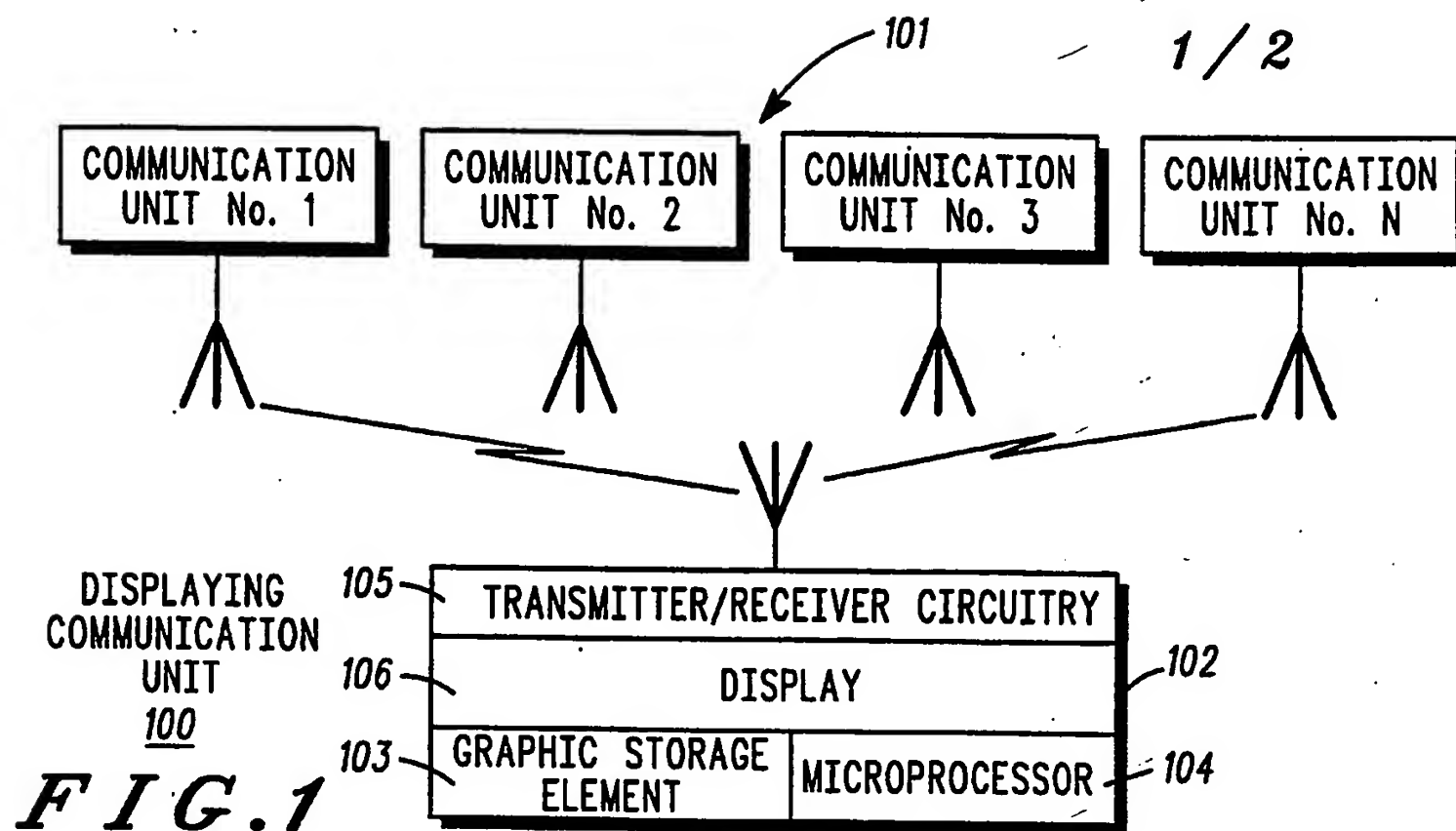
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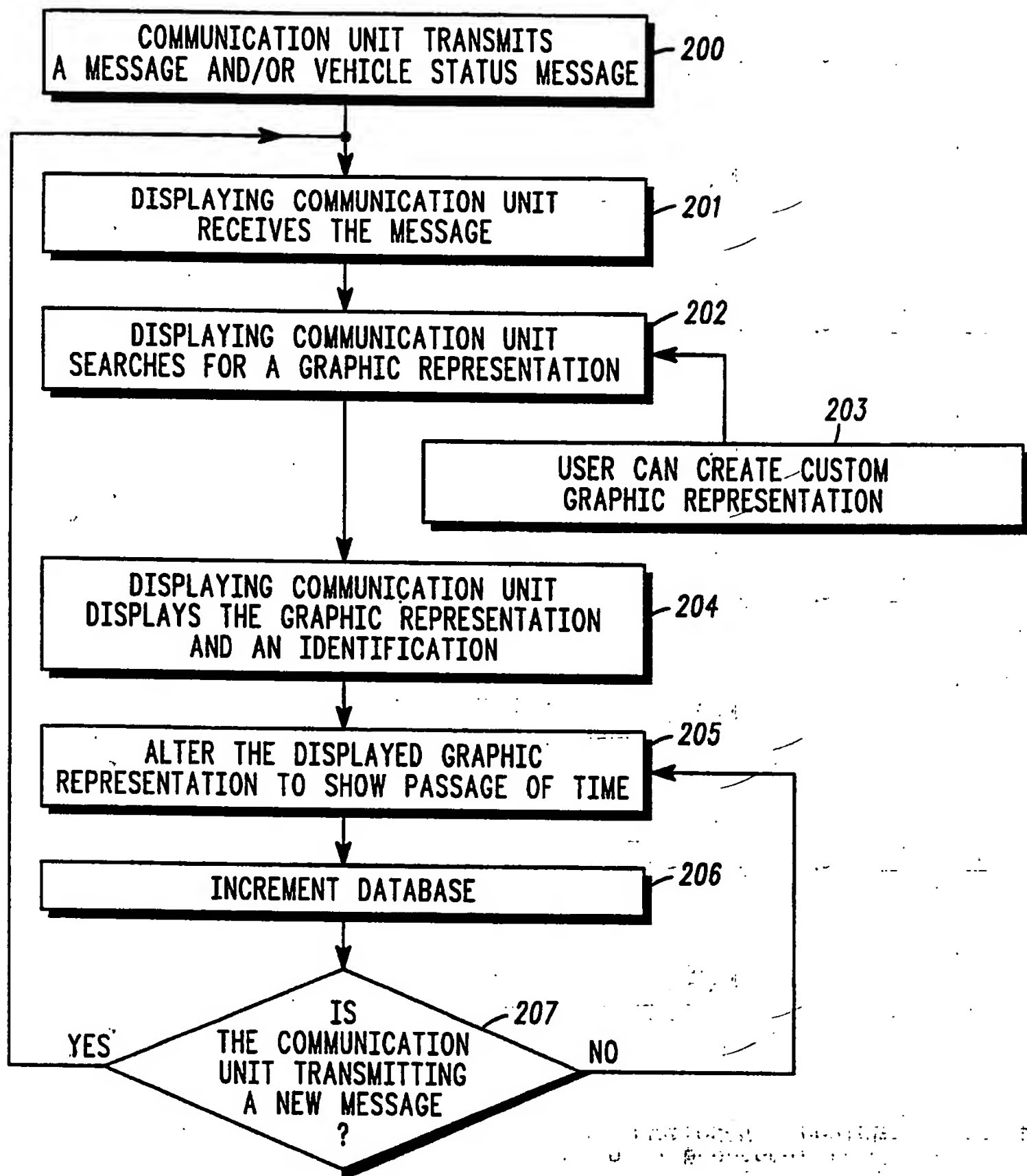
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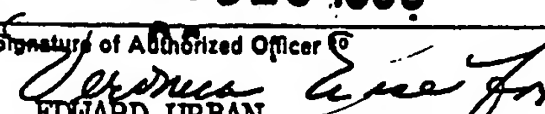
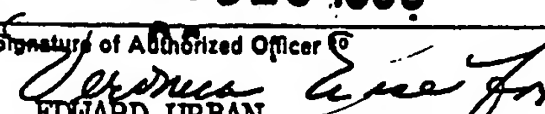
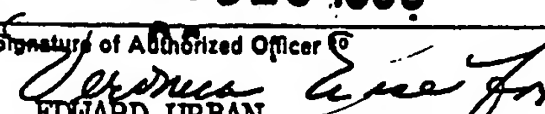


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**FIG. 2**

INTERNATIONAL SEARCH REPORT

International Application No **PCT/US90/04683**

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) ³ According to International Patent Classification (IPC) or to both National Classification and IPC IPC (5): H04B 1/38 U.S. CL.: 455/154																	
II. FIELDS SEARCHED <div style="text-align: center; border-top: 1px solid black; border-bottom: 1px solid black; margin: 5px 0;">Minimum Documentation Searched ⁴</div> <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 25%; border-bottom: 1px solid black;">Classification System</th> <th style="border-bottom: 1px solid black;">Classification Symbols</th> </tr> <tr> <td style="border-right: 1px solid black; padding: 5px; vertical-align: top;">U.S.</td> <td style="padding: 5px; vertical-align: top;">455/154, 155; 340/723, 747, 995; 364/146, 188</td> </tr> </table> <div style="text-align: center; border-top: 1px solid black; border-bottom: 1px solid black; margin: 5px 0;">Documentation Searched other than Minimum Documentation to the extent that such Documents are included in the Fields Searched ⁵</div>			Classification System	Classification Symbols	U.S.	455/154, 155; 340/723, 747, 995; 364/146, 188											
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III. DOCUMENTS CONSIDERED TO BE RELEVANT ¹⁴ <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 10%; border-bottom: 1px solid black;">Category ⁶</th> <th style="border-bottom: 1px solid black;">Citation of Document, ¹⁰ with indication, where appropriate, of the relevant passages ¹⁷</th> <th style="width: 15%; border-bottom: 1px solid black;">Relevant to Claim No. ¹⁸</th> </tr> <tr> <td style="border-right: 1px solid black; text-align: center; vertical-align: top;">X Y</td> <td style="border-right: 1px solid black; padding: 5px; vertical-align: top;">US, A, 4,229,822 (BENCH) 21 October 1980 See column 3, lines 31-42.</td> <td style="padding: 5px; vertical-align: top;">1-2, 5-7, 12-13 3-4, 8-11</td> </tr> <tr> <td style="border-right: 1px solid black; text-align: center; vertical-align: top;">Y</td> <td style="border-right: 1px solid black; padding: 5px; vertical-align: top;">US, A, 4,716,404 (TABATO ET AL) 29 December 1987 See figures 7, 8</td> <td style="padding: 5px; vertical-align: top;">1-13</td> </tr> <tr> <td style="border-right: 1px solid black; text-align: center; vertical-align: top;">Y</td> <td style="border-right: 1px solid black; padding: 5px; vertical-align: top;">S. J. BAKEY, "FROM DESKTOP TO PLANT FLOOR, A CRT IS THE CONTROL OPERATOR'S WINDOW ON THE PROCESS" CONTROL ENGINEERING, JUNE 1984, See page 86-90, especially 87-88</td> <td style="padding: 5px; vertical-align: top;">1-13</td> </tr> <tr> <td style="border-right: 1px solid black; text-align: center; vertical-align: top;">A</td> <td style="border-right: 1px solid black; padding: 5px; vertical-align: top;">NATIONAL INSTRUMENTS PRODUCT BULLETIN, COPYRIGHT 1988, "LABVIEW 2" See entire document</td> <td style="padding: 5px; vertical-align: top;">1-13</td> </tr> </table>			Category ⁶	Citation of Document, ¹⁰ with indication, where appropriate, of the relevant passages ¹⁷	Relevant to Claim No. ¹⁸	X Y	US, A, 4,229,822 (BENCH) 21 October 1980 See column 3, lines 31-42.	1-2, 5-7, 12-13 3-4, 8-11	Y	US, A, 4,716,404 (TABATO ET AL) 29 December 1987 See figures 7, 8	1-13	Y	S. J. BAKEY, "FROM DESKTOP TO PLANT FLOOR, A CRT IS THE CONTROL OPERATOR'S WINDOW ON THE PROCESS" CONTROL ENGINEERING, JUNE 1984, See page 86-90, especially 87-88	1-13	A	NATIONAL INSTRUMENTS PRODUCT BULLETIN, COPYRIGHT 1988, "LABVIEW 2" See entire document	1-13
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<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>[*] Special categories of cited documents: ¹⁵</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 45%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&" document member of the same patent family</p> </div> </div>																	
IV. CERTIFICATION <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; border-bottom: 1px solid black; padding: 5px;">Date of the Actual Completion of the International Search ²</td> <td style="width: 50%; border-bottom: 1px solid black; padding: 5px;">Date of Mailing of this International Search Report ³</td> </tr> <tr> <td style="border-bottom: 1px solid black; padding: 5px; text-align: center;">19 OCTOBER 1990</td> <td style="border-bottom: 1px solid black; padding: 5px; text-align: center;">28 DEC 1990</td> </tr> <tr> <td style="border-bottom: 1px solid black; padding: 5px;">International Searching Authority ¹</td> <td style="border-bottom: 1px solid black; padding: 5px;">Signature of Authorized Officer ¹⁰</td> </tr> <tr> <td style="padding: 5px; text-align: center;">ISA/US</td> <td style="padding: 5px; text-align: center;">  EDWARD URBAN </td> </tr> </table>			Date of the Actual Completion of the International Search ²	Date of Mailing of this International Search Report ³	19 OCTOBER 1990	28 DEC 1990	International Searching Authority ¹	Signature of Authorized Officer ¹⁰	ISA/US	 EDWARD URBAN							
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